

# The RF Line

## NPN Silicon

### RF Low Power Transistor

**MRF8372R1, R2**

Designed primarily for wideband large signal predriver stages in 800 MHz and UHF frequency ranges.

- Specified @ 12.5 V, 870 MHz Characteristics
  - Output Power = 750 mW
  - Minimum Gain = 8.0 dB
  - Efficiency 60% (Typ)
- State-of-the-Art Technology
  - Fine Line Geometry
  - Gold Top Metal and Wires
  - Silicon Nitride Passivated
  - Ion Implanted Arsenic Emitters
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.
- Order MRF8372 in tape and reel packaging by adding suffix:
  - R1 suffix = 500 units per reel
  - R2 suffix = 2,500 units per reel

750 mW, 870 MHz  
RF LOW POWER  
TRANSISTOR  
NPN SILICON



CASE 751-06, STYLE 1  
SORF (SO-8)

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	16	Vdc
Collector-Base Voltage	$V_{CBO}$	36	Vdc
Emitter-Base Voltage	$V_{EBO}$	4.0	Vdc
Collector Current — Continuous	$I_C$	200	mAdc
Total Device Dissipation @ $T_C = 75^\circ\text{C}$ (1) Derate above $75^\circ\text{C}$	$P_D$	1.67 22.2	Watts mW/ $^\circ\text{C}$
Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$
Maximum Junction Temperature	$T_{Jmax}$	150	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	45	$^\circ\text{C}/\text{W}$

#### DEVICE MARKING

MRF8372 = 8372
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#### NOTE:

- Case temperature measured on collector lead immediately adjacent to body of package.

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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**OFF CHARACTERISTICS**

Collector–Emitter Breakdown Voltage ( $I_C = 5.0\text{ mA}$ , $I_B = 0$ )	$V_{(BR)CEO}$	16	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 5.0\text{ mA}$ , $V_{BE} = 0$ )	$V_{(BR)CES}$	36	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 0.1\text{ mA}$ , $I_C = 0$ )	$V_{(BR)EBO}$	4.0	—	—	Vdc
Collector Cutoff Current ( $V_{CE} = 15\text{ Vdc}$ , $V_{BE} = 0$ , $T_C = 25^\circ\text{C}$ )	$I_{CES}$	—	—	0.1	mA

**ON CHARACTERISTICS**

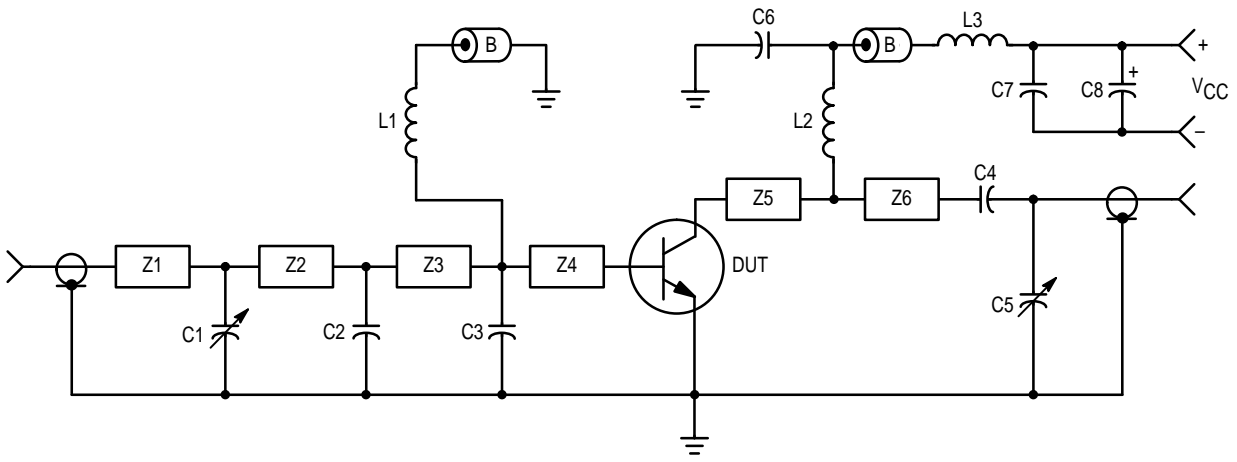
DC Current Gain ( $I_C = 50\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ )	$h_{FE}$	30	90	200	—
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**DYNAMIC CHARACTERISTICS**

Output Capacitance ( $V_{CB} = 15\text{ Vdc}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	1.8	2.5	pF
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**FUNCTIONAL TESTS**

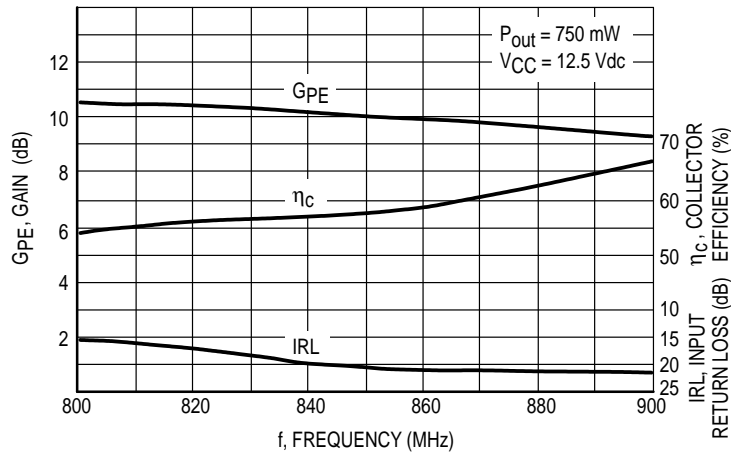
Common–Emitter Amplifier Power Gain ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 0.75\text{ W}$ , $f = 870\text{ MHz}$ )	$G_{pe}$	8.0	10	—	dB
Collector Efficiency ( $V_{CC} = 12.5\text{ Vdc}$ , $P_{out} = 0.75\text{ W}$ , $f = 870\text{ MHz}$ )	$\eta$	55	60	—	%



- |   |  |
|---|--|
| C1, C5 — 0.8–8.0 pF Johanson Gigatrim   | L1, L2 — 4 Turns, #21 AWG, 5/32" ID              |
| C2, C3 — 10 pF Ceramic Chip Capacitor   | L3 — 7 Turns, #21 AWG, 5/32" ID                  |
| C6 — 91 pF Clamped Mica, Mini-Underwood | Z1, Z2 — 1" x 0.078" Microstrip, $Z_0 = 50$ Ohms |
| C4 — 47 pF Ceramic Chip Capacitor       | Z3 — 0.25" x 0.078" Microstrip, $Z_0 = 50$ Ohms  |
| C7 — 91 pF Clamped Mica, Mini-Underwood | Z4 — 0.15" x 0.078" Microstrip, $Z_0 = 50$ Ohms  |
| C8 — 1.0 $\mu$ F 25 V Tantalum          | Z5 — 0.30" x 0.078" Microstrip, $Z_0 = 50$ Ohms  |
| B — Bead, Ferroxcube 56-590-65/3B       | Z6 — 1.63" x 0.078" Microstrip, $Z_0 = 50$ Ohms  |
|   | PCB — 1/32" Glass Teflon, $\epsilon_r = 2.56$    |

**Figure 1. 800–900 MHz Broadband Circuit**

**800/900 MHz BAND DATA**



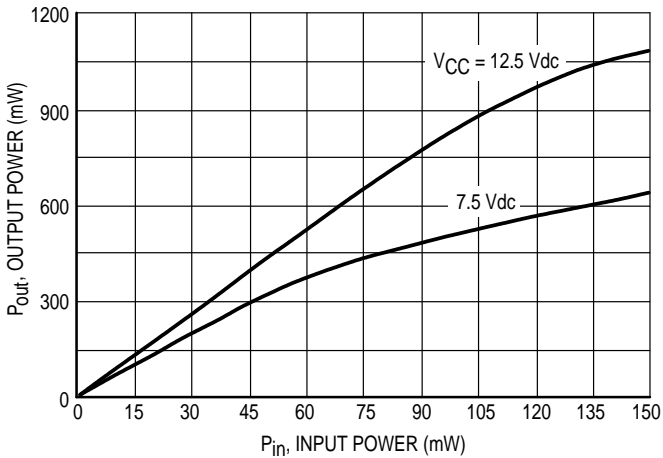
**Figure 2. Typical Broadband Performance**

f Frequency MHz	$Z_{in}$ Ohms		$Z_{OL}^*$ Ohms	
	$V_{CC} = 7.5\text{ V}$	$V_{CC} = 12.5\text{ V}$	$V_{CC} = 7.5\text{ V}$	$V_{CC} = 12.5\text{ V}$
	$P_{in} = 150\text{ mW}$	$P_{in} = 100\text{ mW}$	$P_{out} = 806\text{ MHz} = 820\text{ mW}$ $P_{out} = 870\text{ MHz} = 635\text{ mW}$ $P_{out} = 960\text{ MHz} = 530\text{ mW}$	$P_{out} = 806\text{ MHz} = 1.05\text{ mW}$ $P_{out} = 870\text{ MHz} = 855\text{ mW}$ $P_{out} = 960\text{ MHz} = 580\text{ mW}$
806	$8.0 + j1.9$	$4.0 + j1.2$	$24.7 - j19.2$	$20.9 - j31.0$
870	$5.2 + j3.5$	$6.0 + j1.9$	$36.9 - j20.5$	$32.1 - j26.6$
960	$6.8 + j4.0$	$6.1 + j2.5$	$39.3 - j18.5$	$36.3 - j25.7$

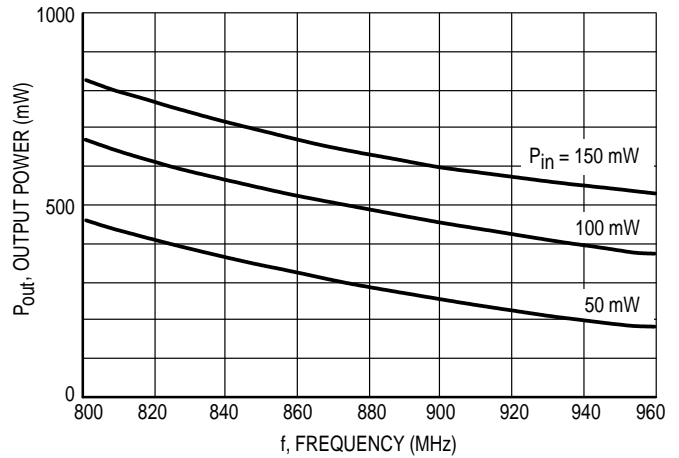
$Z_{OL}^*$  = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage, and frequency.

**Table 1. Series Equivalent Input/Output Impedance**

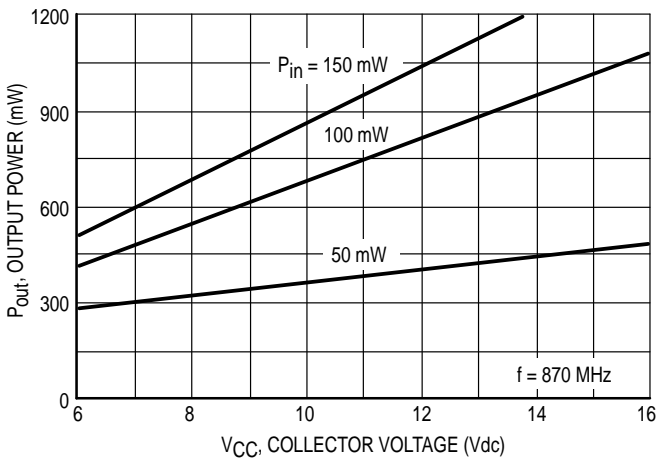
**TYPICAL CHARACTERISTICS  
800/900 MHz BAND DATA (continued)**



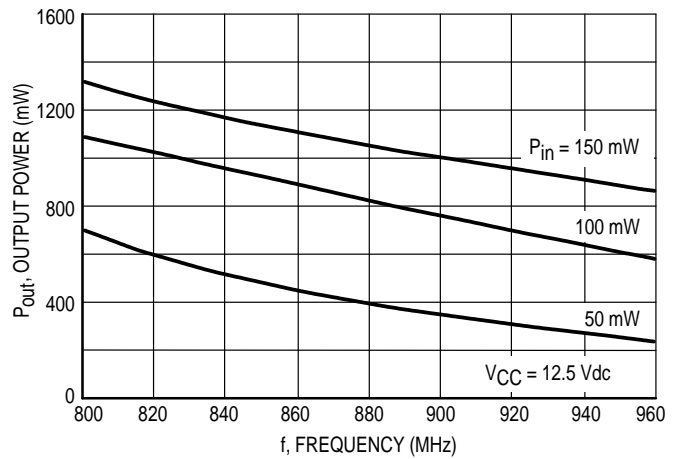
**Figure 3. Output Power versus Input Power  
f = 870 MHz**



**Figure 4. Output Power versus Frequency  
VCC = 7.5 Vdc**

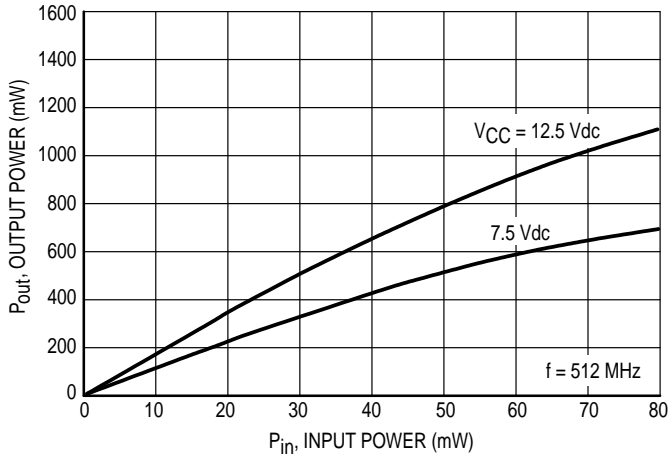


**Figure 5. Output Power versus Collector Voltage**

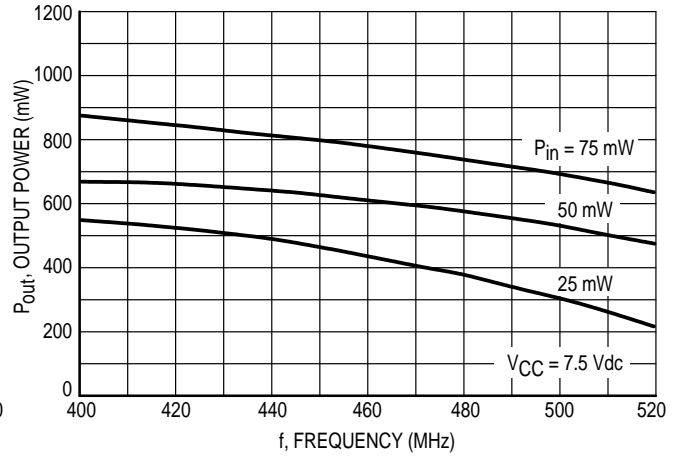


**Figure 6. Output Power versus Frequency**

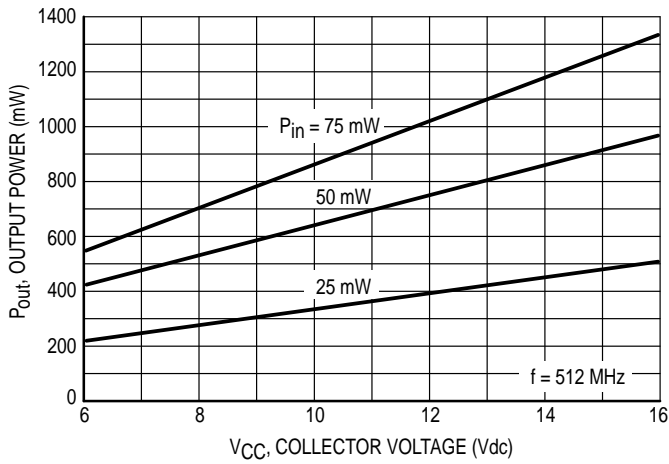
**TYPICAL CHARACTERISTICS**  
**800/900 MHz BAND DATA (continued)**



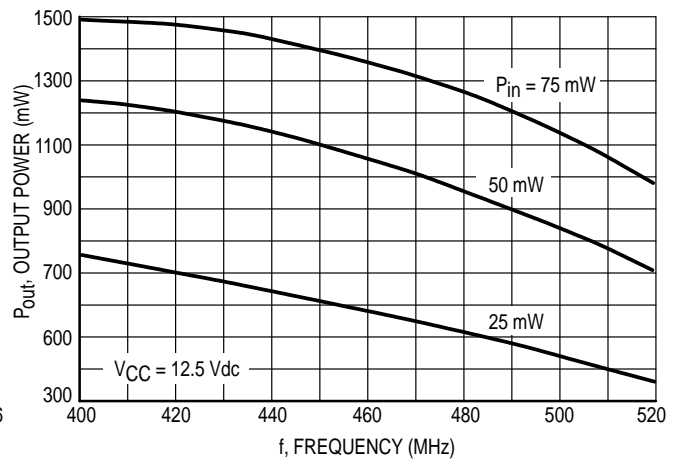
**Figure 7. Output Power versus Input Power**



**Figure 8. Output Power versus Frequency**

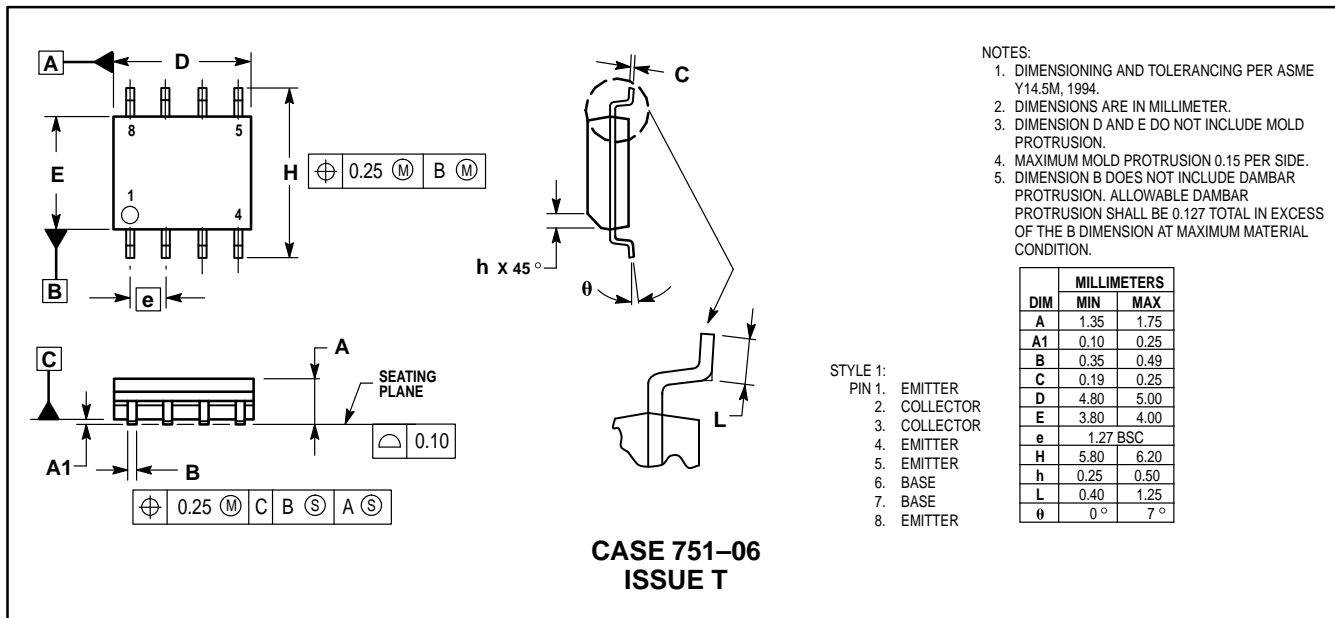


**Figure 9. Output Power versus Collector Voltage**



**Figure 10. Output Power versus Frequency**

## PACKAGE DIMENSIONS



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